

DRAM

DEMAND RESPONSE and ADVANCED METERING Coalition

DEMAND RESPONSE AND ADVANCED METERING FACT SHEET

DEMAND RESPONSE INCLUDES TIME-BASED PRICING AND INTERRUPTIBLE AND CURTAILABLE PROGRAMS

Demand response is when energy users lower energy consumption during peak periods in return for receiving savings on their bills. Those savings can be a result of energy prices that are higher during peak hours (via Time-Based Pricing) or through payments made in return for specific actions, such as reducing energy use to a lower, agreed-upon usage threshold (via Interruptible and Curtailable Programs). These programs require the participation of end-use, retail customers, but can be implemented by load serving entities such as utilities or by wholesale exchanges, such as Regional Transmission Organizations (RTOs).

WE CAN SAVE BILLIONS

According to McKinsey Consulting, Princeton University, the California Energy Commission, and others, Americans can save from \$10 billion to \$19 billion every year by balancing investment in new power plants with demand response programs. Most of the savings comes from reduced costs to build power plants and transmission lines and to purchase electricity in wholesale markets.

DEMAND RESPONSE MEANS FEWER POWER PLANTS

Demand response is a lower-cost and environmentally-friendlier option to building more power plants and transmission lines. None of us wants black-outs, so we need to be sure that

enough plants and lines are available to meet the highest demands of the year. We can achieve this goal either through spending billions on more resources or turning off a few lights, appliances, and other equipment on those few days a year when energy usage is extremely high. Building power plants to meet peak loads costs \$600 per kilowatt-demand response costs only one-sixth as much as peakers, or \$100 per kilowatt! These figures are from the California Energy Commission.

DEMAND RESPONSE LOWER WHOLESALE PRICES

Demand response reduces prices in wholesale power markets, too. This is because wholesale prices rise when supplies are short as a result of heavy demand during peak hours a few days each year. At such times, wholesale prices spike up as much as 1,000 percent. End users reducing consumption during those hours eliminate the supply shortage, reducing wholesale prices – and creating savings for all electricity users, not just demand response volunteers.

SMART METERS MAKE IT POSSIBLE

Today's electric meters, with a few exceptions, use 100-year old technology and record energy usage only once a month. Consumers must pay for high-cost peak power even if they are not using energy during the peak hours. Smart, or advanced, meters record energy usage throughout the day, every fifteen minutes or every hour. And they send their data in

every day. This lets consumers choose when they use power and save on their bills if they can use less during the peak hours. Whether demand response discounts are given in the price of power or through payments for curtailment, smart meters are needed to record the peak load reductions.

RESIDENTIAL CUSTOMERS ARE KEY

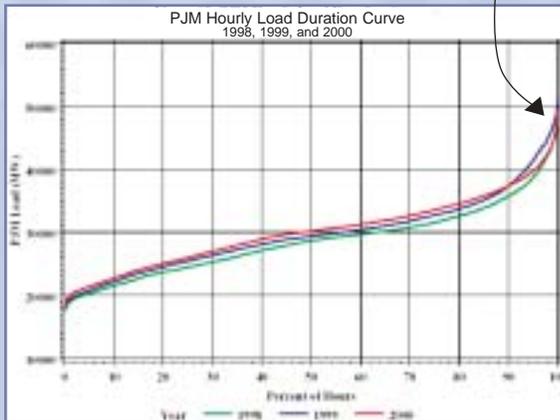
Residential consumers deserve the same chance to lower their bills as businesses. Also, today's solid-state meters and information systems make it nearly as easy to operate millions of advanced meters as it is to operate hundreds of thousands. Moreover, even though they consume only 40% of electricity, residential users would provide 53% of the demand response savings according to McKinsey. This is because residential consumers are better at managing their energy budgets; they have what economists call a higher price elasticity of demand.

Giving residential consumers demand response choices should be done, can be done, and is cost-effective.

WE NEED DEMAND RESPONSE ONLY A FEW HOURS PER YEAR

One reason demand response is a good choice is that we need it only a few days per year. The chart on the next page, a *Load Duration Curve*, shows the amount of time that total electricity use, or demand, is required during the year. Most of the year, less than 45,000 megawatts are needed in the Pennsylvania-New Jersey-Maryland (PJM) area. But two percent of the time – less than 200 hours – demand spikes

Note how the highest 15% of the load - 7,500 MW - is used only 2% of the time, or less than 200 hours per year.



SOURCE: PJM Interconnection, State of the Market Report 2000, June 2001.

up as much as 7,500 megawatts. If power consumers reduced their usage during these few hours, we would need 15 percent fewer power plants!

WE KNOW IT WORKS

Matching supply and demand works well wherever consumers are allowed to choose the prices they pay – from advance airline tickets to long distance calls on nights or weekends. In electricity, Puget Sound Energy has led the way. In May 2001, Puget placed over 300,000 volunteers on a time-of-use rate (the customers were switched automatically, and less than one percent chose to go back to flat rates). Since then, on average, these residential consumers reduced peak demand by six percent and total power usage by five percent. And 90 percent said they would recommend the program to a friend.

SMART METERS MAKE IT BETTER

California implemented the 20:20 Program in the summer of 2001. In return for 20 percent discounts, a third of Californians reduced energy use by over 20 percent. It was highly successful in reducing wholesale prices and preventing rolling blackouts that had been widely expected. However, the state was paying consumers the equivalent of 28 cents per kilowatt-hour to turn lights off at 2 a.m., when load reductions were needed only on weekday afternoons. The solution: smart meters would have given discounts only when the demand

reductions were needed. Same results, lower cost.

SMART METERS CAN BE CHEAP

In the past, smart meters have cost up to \$3,000 or more for a single customer. The cost is now as low as \$50 for a meter and less than \$50 for all of installation, information systems, implementation, and other expenses – a total cost of less than \$100 per smart

meter. The keys to achieving these numbers are large volumes – millions of meters – and scale economies – installing smart meters on every customer in a geographical area. One-by-one installation of meters can cost, according to the New York Public Service Commission, seven times as much as installation in a large-scale deployment.

SMART METERS ENHANCE ENERGY EFFICIENCY AND DISTRIBUTED GENERATION

By giving consumers the full benefit of energy conservation during peak hours, smart meters and time-based pricing make energy efficiency a better deal. Efficient air conditioners, programmable thermostats, even insulation become more cost-effective. In the same way, distributed generation, particularly solar power, becomes more economic when used to displace higher on-peak energy prices (or, better yet, selling power back to the grid!).

VOLUNTARY PARTICIPATION PROTECTS ALL

Time-of-use, peak-day, and real-time prices must be provided only to volunteers among small commercial and residential customers. Voluntary participation delivers peak reductions without imposing hardships on small users who would pay higher bills on time-based rates. All consumers should always have the choice of a flat rate.

Voluntary demand response programs

are still cost effective, since volunteers take the actions needed (as in Puget's time-of-use program and California's 20:20 program). And existing programs, including Puget's and Pacific Gas & Electric's, have found that, in spite of perceptions to the contrary, volunteers for time-based rates do not have less on-peak usage to start with.

TIME-OF-USE, PEAK-DAY, AND REAL-TIME PRICING

Time-based pricing can take many forms. Wholesale electricity costs typically vary each hour. To make it easy for small consumers to remember and respond to prices, these hourly costs are typically grouped into time-of-use periods, usually no more than four peak or off-peak periods per season (weekday afternoons in summer usually being peak, with nights, weekends, and all winter usually being off-peak).

With another simple option, peak-day pricing, extra discounts can be offered to customers on those 10 to 20 days per year when demand peaks would otherwise hit critically high levels (think of a California-type 20:20 program offered to all customers for, say eight hours, on 20 peak days per year).

Real-time pricing usually has prices that change each hour, like the wholesale markets. Such prices are best suited for large and sophisticated customers – or customers, including even residential customers, that have devices that can automatically turn appliances or equipment on or off to respond to changing hourly prices.

CURTAILABLE AND INTERRUPTIBLE PROGRAMS

In addition to simple, time-based pricing, demand response can be achieved through centralized control of customer loads or dispatch of load reduction orders. Customer loads such as industrial processes, air conditioners, or other uses, can be automatically turned off centrally by a utility or other entity. In curtailments, the central entity orders participants to reduce load to an agreed-upon level that is lower than the customer's usual load. Participants receive incentive payments for agreeing to reduce their loads in this fashion. These programs are typically used, or "dispatched", only 10 to 20 days per year. ♦